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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,471	04/27/2006	Yuji Iwaki	0756-7673	4788

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EXAMINER	
WILSON, MICHAEL H	
ART UNIT	**PAPER NUMBER**
1786	

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12/20/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,471	IWAKI ET AL.	
	Examiner	Art Unit	
	MICHAEL H. WILSON	1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,13-21 and 25-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,13-21 and 25-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20100930; 20101008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 September 2010 has been entered.

Response to Amendment

2. This Office action is in response to Applicant's amendment filed 30 September 2010, which adds new claims 30-36.

Claims 1-9, 13-21, and 25-36 are pending.

Claim Objections

3. Claims 30-36 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Regarding claims 30-36, these claims fail to further limit the parent claims because they only add the limitation that the composition “has transparency.”

Transparency is a property like absorbance. Every composition has a transparency and having transparency is not the same as being transparent. A composition that is transparent has a high transparency, while an opaque composition has a low transparency. Also it is noted that the claims do not recite what region of the electromagnetic spectrum must posses the claimed property. If the claim were amended to recite that the composition is transparent Applicants data demonstrates that the claimed composition is not transparent at 300 nm.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-3, 5, 6, 8, 9, 13-15, 17, 18, 20, 21, 25-33, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (US 2003/0218418 A9) in view of Seo et al. (US 2002/0086180 A1) and Shiratsuchi et al. (US 6,084,176).

Regarding claims 1-3, 5, 6, 8, 9, 13-15, 17, 18, 20, 21, and 28, Sato et al. disclose a light-emitting element comprising a first and second electrode [0031], a light-emitting layer between the electrodes [0031], and a layer hole transporting layer [0172]. Additionally the reference discloses the hole transporting layer ensures high efficiency in hole injection from the anode and efficient transportation of hole to the light-emitting layer [0172]. Compounds such as 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl, aromatic amine compounds having a star burst structure, and spiro compounds such as 2,2',7,7'-tetrakis(diphenylamino)-9,9'-spirobifluorene are disclosed as suitable for the hole transport layer. The reference also discloses metal oxides such as ruthenium oxide and molybdenum oxide as able to facilitate hole injection from the anode with high hole mobility ([0211]-[0212]). A layer of metal oxide on the anode is disclosed to lower initial driving voltage, suppress the voltage elevation on continuous driving, and improve adhesion [0211]. However the reference does not explicitly disclose a carbazole compound with a transition metal oxide in the hole transporting layer.

Seo et al. teach a similar organic electroluminescent device (abstract). The reference teaches combining the hole injection and transport layers into a single mixed layer [0033]. By combining the layers the reference teaches an energy barrier can be reduced lowering drive voltage and increasing service life of the device ([0032]-[0034]).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the hole transport and injection layers, as taught by of Seo et al., in the device of Sato et al. One of ordinary skill in the art would reasonably expect such a layer to be suitable given that Seo et al. and Sato et al. both teach similar phosphorescent organic

electroluminescent devices. Additionally Sato et al. teach that materials used for the hole transporting layer need a small ionization potential, high hole mobility, and excellent stability [0172], which are properties Sato et al. discloses metal oxides to possess ([0211]-[0212]). Ruthenium oxide and molybdenum oxide are also disclosed to efficiently inject holes from the anode and transport the holes to subsequent layers, which is disclosed as the function of the hole transport layer [0172]. One of ordinary skill in the art would reasonably expect that *adding* oxides of ruthenium or molybdenum to the hole transport layer would not destroy the function of the layer given that Sato et al. clearly discloses the metal oxides to possess properties desirable for the hole transport layer. One of ordinary skill in the art would be motivated by a desire to improve adhesion (Sato et al. [0211]), lower the drive voltage, suppress the voltage elevation on continuous driving, and increase the service life of the device.

Shiratsuchi et al. teach carbazole compounds of instant general formulae (1), (2) with Ar of instant formula 2-1 (compound H-23, column 23), and (3) (compound H-38 column 29) with instant Ar 3-1 (compounds H-24, column 23) and as suitable compounds for the hole transport layer (column 13, line 12 to column 14, line 5) used in a photoelectric device (column 2, lines 12-16). The reference also teaches carbazole compounds as equivalent with the hole transporting compounds of Sato et al. such as 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl, aromatic amine compounds having a star burst structure, and tertiary amine containing fluorene compounds for use in the hole transport layer (column 13, line 12 to column 14, line 5).

In view of Shiratsuchi et al.'s recognition that carbazole compounds and hole transporting compounds of Sato et al. are equivalent and interchangeable, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the hole transporting compounds of Sato et al. with carbazole compounds such as H-23, H-24, or H-38 taught by Shiratsuchi et al. and thereby arrive at the present invention. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958). Additionally because Shiratsuchi et al. teach carbazole compounds to be hole transporting materials suitable for a hole transporting layer in electroluminescent devices it would be obvious to one of ordinary skill in the art at the time of the invention to use the carbazole compounds taught by Shiratsuchi et al. as hole transporting material in the hole transporting layer of modified Sato et al. Case law holds that the selection of a known material based on its suitability for its intended use supports prima facie obviousness. *Sinclair & Carroll Co vs. Interchemical Corp.*, 325 US 327, 65 USPQ 297 (1045).

Regarding claims 25 and 26, modified Sato et al. disclose all the claim limitations as set forth above. Additionally the reference discloses a means for controlling light emission of the light-emitting element given that the voltage needed to obtain a specific luminance is reported (table 3, page 46). Also the reference discloses an electronic appliance with a display portion comprised of a light emitting element [0261].

Regarding claim 27, modified Sato et al. disclose all the claim limitations as set forth above. Additionally the reference discloses the thickness of a hole transport layer to be between 10 and 100 nm, overlapping with the presently claimed range [0177].

Regarding claim 29 modified Sato et al. disclose all the claim limitations as set forth above. Additionally the claimed range encompasses a 1:1 mixture of the compounds. When faced with a mixture, one of ordinary skill in the art would be motivated by common sense to select a 1:1 ratio, absent evidence of unexpected results. Case law holds that "[h]aving established that this knowledge was in the art, the examiner could then properly rely... on a conclusion of obviousness, 'from common knowledge and common sense of the person of ordinary skill in the art within any specific hint or suggestion in a particular reference.'" *In re Bozek*, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969).

Regarding claims 30-33, 35, and 36, modified Sato et al. disclose all the claim limitations as set forth above. Additionally the reference discloses that the hole transport layer should have preferably 80% transmittance to visible light [0171]. It is noted that the claim merely requires a composition to have “transparency”. This is not the same as stating the composition is transparent. Every composition has transparency just as every composition has transmittance. The percentage of transparency and transmittance will vary from composition to composition. For example a transparent composition will have high transparency while an opaque composition has a low transparency. However both compositions have transparency. Therefore the claim limitation is met by the composition of modified Sato et al.

7. Claims 1, 4, 7-9, 13, 16, 19-21, 25, 26, 28, 30, 31, and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (US 2003/0218418 A9) in view of Seo et al. (US 2002/0086180 A1) and Shirota et al. (US 5,487,953).

Regarding claims 1, 4, 7-9, 13, 16, 19-21, and 28, Sato et al. disclose a light-emitting element comprising a first and second electrode [0031], a light-emitting layer between the electrodes [0031], and a layer hole transporting layer [0172]. Additionally the reference discloses the hole transporting layer ensures high efficiency in hole injection from the anode and efficient transportation of hole to the light-emitting layer [0172]. Compounds such as 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl, aromatic amine compounds having a star burst structure, and spiro compounds such as 2,2',7,7'-tetrakis(diphenylamino)-9,9'-spirobifluorene are disclosed as suitable for the hole transport layer. The reference also discloses metal oxides such as ruthenium oxide and molybdenum oxide as able to facilitate hole injection from the anode with high hole mobility ([0211]-[0212]). A layer of metal oxide on the anode is disclosed to lower initial driving voltage, suppress the voltage elevation on continuous driving, and improve adhesion [0211]. However the reference does not explicitly disclose a carbazole compound with a transition metal oxide in the hole transporting layer.

Seo et al. teach a similar organic electroluminescent device (abstract). The reference teaches combining the hole injection and transport layers into a single mixed layer [0033]. By combining the layers the reference teaches an energy barrier can be reduced lowering drive voltage and increasing service life of the device ([0032]-[0034]).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the hole transport and injection layers, as taught by of Seo et al., in the device of Sato et al. One of ordinary skill in the art would reasonably expect such a layer to be suitable given that Seo et al. and Sato et al. both teach similar phosphorescent organic electroluminescent devices. Additionally Sato et al. teach that material used for the hole transporting layer needs a small ionization potential, high hole mobility, and excellent stability [0172], which are properties Sato et al. discloses metal oxides to have ([0211]-[0212]). Ruthenium oxide and molybdenum oxide are also disclosed to efficiently inject holes from the anode and transport the holes to subsequent layers, which is disclosed as the function of the hole transport layer [0172]. One of ordinary skill in the art would reasonably expect that *adding* oxides of ruthenium or molybdenum to the hole transport layer would not destroy the function of the layer given that Sato et al. clearly discloses the metal oxides to possess properties desirable for the hole transport layer. One of ordinary skill in the art would be motivated by a desire to improve adhesion (Sato et al. [0211]), lower the drive voltage, suppress the voltage elevation on continuous driving, and increase the service life of the device.

Shirota et al. teach carbazole compounds of instant general formula (4) as suitable compounds for the hole transport layer (column 4, lines 38-41, compound 3) used in an organic electroluminescent device (abstract). The reference teaches the compound to have high heat resistance capable enable high luminance with a high efficiency for a long time (column 1, lines 57-60).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the carbazole compounds of Shirota et al. with the device of modified Sato et al. One of ordinary skill in the art would reasonably expect the compounds of Shirota et al. to be suitable in the hole transport layer of modified Sato et al. given that the compound is taught as suitable for the hole transport layer of a similar electroluminescent device by Shirota et al. (column 4, lines 38-65). One of ordinary skill in the art would be motivated by a desire to have high heat resistance capable enable high luminance with a high efficiency for a long time (column 1, lines 57-60).

Regarding claims 25 and 26, modified Sato et al. disclose all the claim limitations as set forth above. Additionally the reference discloses a means for controlling light emission of the light-emitting element given that the voltage needed to obtain a specific luminance is reported (table 3, page 46). Also the reference discloses an electronic appliance with a display portion comprised of a light emitting element [0261].

Regarding claims 30, 31, and 34-36, modified Sato et al. disclose all the claim limitations as set forth above. Additionally the reference discloses that the hole transport layer should have preferably 80% transmittance to visible light [0171]. It is noted that the claim merely requires a composition to have “transparency”. This is not the same as stating the composition is transparent. Every composition has transparency just as every composition has transmittance. The percentage of transparency and transmittance will vary from composition to composition. For example a transparent composition will have high transparency while an opaque composition has

a low transparency. However both compositions have transparency. Therefore the claim limitation is met by the composition of modified Sato et al.

8. Claims 1-3, 5, 6, 8, 9, 13-15, 17, 18, 20, 21, and 25-33, 35, and 36 rejected under 35 U.S.C. 103(a) as being obvious over Ikeda et al. (US 7,732,808 B2) in view of Shiratsuchi et al. (US 6,084,176).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claims 1-3, 5, 6, 8, 9, 13-15, 17, 18, 20, 21, and 27-29, Ikeda et al. disclose a light-emitting element comprising a first and second electrode (column 1, lines 55-61), a light-emitting layer between the electrodes (column 5, lines 15-25), and a layer hole transporting layer (column 5, lines 4-14). The reference discloses a first layer in contact with the first electrode comprising a metal oxide like ruthenium oxide and molybdenum oxide and a compound with high hole transportation properties (column 4, lines 27-47). Compounds such as α-NPD, TPD, TDATA and MTDATA are discloses as suitable compounds. The reference also discloses that other hole transporting materials would be suitable as long as the hole transporting property of the material is higher than the electron transporting property (column 4, lines 45-47). The first layer is disclosed with a thickness of 130 nm and a metal oxide: hole transporting compound weight ratio of 0.245:1, overlapping with the claimed molar ratio (column 7, lines 50-55). However the reference does not explicitly disclose a carbazole compound as the hole transporting compound of the first layer.

Shiratsuchi et al. teach carbazole compounds of instant general formulae (1), (2) with Ar of instant formula 2-1 (compound H-23, column 23), and (3) (compound H-38 column 29) with instant Ar 3-1 (compounds H-24, column 23) and as suitable compounds for the hole transport layer (column 13, line 12 to column 14, line 5) used in a photoelectric device (column 2, lines 12-16). The reference also teaches carbazole compounds as equivalent with the hole transporting compounds such as 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl, aromatic amine compounds having a star burst

structure, and tertiary amine containing fluorene compounds for use in the hole transport layer (column 13, line 12 to column 14, line 5).

In view of Shiratsuchi et al.'s recognition that carbazole compounds are hole transporting compounds and are equivalent and interchangeable with other hole transporting compounds, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the hole transporting compounds of Ikeda et al. with carbazole compounds such as H-23, H-24, or H-38 taught by Shiratsuchi et al. and thereby arrive at the present invention. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958). Additionally because Shiratsuchi et al. teach carbazole compounds to be hole transporting materials suitable in electroluminescent devices it would be obvious to one of ordinary skill in the art at the time of the invention to use the carbazole compounds taught by Shiratsuchi et al. as hole transporting material in the first layer of Ikeda et al. Case law holds that the selection of a known material based on its suitability for its intended use supports prima facie obviousness. *Sinclair & Carroll Co vs. Interchemical Corp.*, 325 US 327, 65 USPQ 297 (1045).

Regarding claims 25 and 26, modified Ikeda et al. disclose all the claim limitations as set forth above. Additionally the reference discloses a means for controlling light emission of the light-emitting element (column 7, lines 13-26). Also the

reference discloses an electronic appliance with a display portion comprised of a light emitting element (column 12, lines 1-47).

Regarding claims 30-33, 35, and 36, modified Ikeda et al. disclose all the claim limitations as set forth above. It is noted that the claim merely requires a composition to have "transparency". This is not the same as stating the composition is transparent. Every composition has transparency just as every composition has transmittance. The percentage of transparency and transmittance will vary from composition to composition. For example a transparent composition will have high transparency while an opaque composition has a low transparency. However both compositions have transparency. Therefore the claim limitation is met by the composition of modified Sato et al.

9. Claims 1, 4, 7-9, 13, 16, 19-21, and 25-31, and 34-36 rejected under 35 U.S.C. 103(a) as being obvious over Ikeda et al. (US 7,732,808 B2) in view of Shirota et al. (US 5,487,953).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed

in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claims 1, 4, 7-9, 13, 16, 19-21, and 27-29, Ikeda et al. disclose a light-emitting element comprising a first and second electrode (column 1, lines 55-61), a light-emitting layer between the electrodes (column 5, lines 15-25), and a layer hole transporting layer (column 5, lines 4-14). The reference discloses a first layer in contact with the first electrode comprising a metal oxide like ruthenium oxide and molybdenum oxide and a compound with high hole transportation properties (column 4, lines 27-47). Compounds such as α-NPD, TPD, TDATA and MTDATA are discloses as suitable compounds. The reference also discloses that other hole transporting materials would be suitable as long as the hole transporting property of the material is higher than the electron transporting property (column 4, lines 45-47). The first layer is disclosed with a thickness of 130 nm and a metal oxide: hole transporting compound weight ratio of 0.245:1, overlapping with the claimed molar ratio (column 7, lines 50-55). However the reference does not explicitly disclose a carbazole compound as the hole transporting compound of the first layer.

Shirota et al. teach carbazole compounds of instant general formula (4) as suitable compounds for the hole transport layer (column 4, lines 38-41, compound 3) used in an organic electroluminescent device (abstract). The reference teaches the compound to have high heat resistance capable enable high luminance with a high efficiency for a long time (column 1, lines 57-60).

It would be obvious to one of ordinary skill in the art at the time of the invention to use the carbazole compounds of Shirota et al. in the first layer of Ikeda et al. One of ordinary skill in the art would reasonably expect the compounds of Shirota et al. to be suitable given that the compounds are taught as suitable hole transport compounds in electroluminescent devices by Shirota et al. (column 4, lines 38-65). One of ordinary skill in the art would be motivated by a desire to have high heat resistance capable enable high luminance with a high efficiency for a long time (column 1, lines 57-60).

Regarding claims 25 and 26, modified Ikeda et al. disclose all the claim limitations as set forth above. Additionally the reference discloses a means for controlling light emission of the light-emitting element (column 7, lines 13-26). Also the reference discloses an electronic appliance with a display portion comprised of a light emitting element (column 12, lines 1-47).

Regarding claims 30, 31, and 34-36, modified Ikeda et al. disclose all the claim limitations as set forth above. It is noted that the claim merely requires a composition to have “transparency”. This is not the same as stating the composition is transparent. Every composition has transparency just as every composition has transmittance. The percentage of transparency and transmittance will vary from composition to

composition. For example a transparent composition will have high transparency while an opaque composition has a low transparency. However both compositions have transparency. Therefore the claim limitation is met by the composition of modified Ikeda et al.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In *re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-3, 5, 6, 8, 9, 13-15, 17, 18, 20, 21, and 25-33, 35, and 36 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-10, 15 and 16 of U.S. Patent 7,732,808 B2 in view of Shiratsuchi et al. (US 6,084,176).

While the claims are not identical there is significant overlap in the claims. U.S. Patent 7,732,808 B2 teaches a light-emitting element comprising a light emitting layer and a mixed layer of molybdenum oxide and an aromatic amine compound between a pair of electrodes (patented claim 1). The mixed layer is adjacent to the anode (patented claim 6). The patent also teaches an electronic appliance comprising the light-emitting element, such as a person computer, a television, or a navigation system (patented claim 15). These appliances necessarily comprise a display portion and a means for controlling light emission of the light-emitting element. However the patent does not explicitly teach a carbazole compound as the arylamine compound.

Shiratsuchi et al. teach carbazole compounds of instant general formulae (1), (2) with Ar of instant formula 2-1 (compound H-23, column 23), and (3) (compound H-38 column 29) with instant Ar 3-1 (compounds H-24, column 23) and as suitable compounds for the hole transport layer (column 13, line 12 to column 14, line 5) used in a photoelectric device (column 2, lines 12-16). The reference also teaches the carbazole compounds as equivalent and interchangeable with the hole transporting arylamine compounds of copending application (column 13, line 12 to column 14, line 5).

In view of Shiratsuchi et al.'s recognition that the carbazole compounds and the hole transporting compounds of patent are equivalent and interchangeable, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the arylamine compounds of patent with carbazole compounds such as H-23, H-24, or H-38 taught by Shiratsuchi et al. and thereby arrive at the present invention.

Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958).

Applicants' attention is drawn to MPEP 804 where it is disclosed that "the specification can always be used as a dictionary to learn the meaning of a term in a patent claim." *In re Boylan*, 392 F.2d 1017, 157 USPQ 370 (CCPA 1968). Further, those portions of the specification which provide support for the patent claims may also be examined and considered when addressing the issue of whether a claim in an application defines an obvious variation of an invention claimed in the patent. (underlining added by examiner for emphasis) *In re Vogel*, 422 F.2d 438,164 USPQ 619,622 (CCPA 1970). Consistent with the above underlined portion of the MPEP citation, attention is drawn to paragraphs [0058]-[0061] which clearly teach one of ordinary skill in the art to use a ratio of 0.245:1(oxide: NPD) and a thickness of 130 nm for the mixed layer. Regarding instant claims 30-33, 35, and 36, the claim merely requires a composition to have "transparency". Transparency is a property like absorbance. This is not the same as stating the composition is transparent. Every composition has transparency just as every composition has transmittance. The percentage of transparency and transmittance will vary from composition to composition. For example a transparent composition will have high transparency while an opaque composition will have a low transparency. However both compositions have transparency. Therefore the claim limitation is met.

Therefore, given the overlap between the present claims and the patented claims, it would have been within the skill level of, as well as obvious to, one of ordinary skill in the art to use the device which is both disclosed by U.S. Patent 7,732,808 B2 and encompassed by the scope of the present claims in view of Shiratsuchi et al. (US 6,084,176) and thereby arrive at the present invention.

12. Claims 1, 4, 7-9, 13, 16, 19-21, and 25-31, and 34-36 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-10, 15, and 16 of U.S. Patent 7,732,808 B2 in view of Shirota et al. (US 5,487,953).

While the claims are not identical there is significant overlap in the claims. U.S. Patent 7,732,808 B2 teaches a light-emitting element comprising a light emitting layer and a mixed layer of molybdenum oxide and an aromatic amine compound between a pair of electrodes (patented claim 1). The mixed layer is adjacent to the anode (patented claim 6). The patent also teaches an electronic appliance comprising the light-emitting element, such as a person computer, a television, or a navigation system (patented claim 15). These appliances necessarily comprise a display portion and a means for controlling light emission of the light-emitting element. However the patent does not explicitly teach a carbazole compound as the arylamine compound.

Shirota et al. teach carbazole compounds of instant general formula (4) as suitable compounds for the hole transport layer (column 4, lines 38-41, compound 3) used in a organic electroluminescent device (abstract). The reference teaches the

compound to have high heat resistance capable enable high luminance with a high efficiency for a long time (column 1, lines 57-60).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the carbazole compounds of Shirota et al. with the device of patent. One of ordinary skill in the art would reasonably expect the compounds of Shirota et al. to be suitable in the mixed layer of patent given that the compound is taught as suitable for transporting holes in similar electroluminescent devices by Shirota et al. (column 4, lines 38-65). One of ordinary skill in the art would be motivated by a desire to have high heat resistance capable enable high luminance with a high efficiency for a long time (column 1, lines 57-60).

Applicants' attention is drawn to MPEP 804 where it is disclosed that "the specification can always be used as a dictionary to learn the meaning of a term in a patent claim." *In re Boylan*, 392 F.2d 1017, 157 USPQ 370 (CCPA 1968). Further, those portions of the specification which provide support for the patent claims may also be examined and considered when addressing the issue of whether a claim in an application defines an obvious variation of an invention claimed in the patent. (underlining added by examiner for emphasis) *In re Vogel*, 422 F.2d 438,164 USPQ 619,622 (CCPA 1970). Consistent with the above underlined portion of the MPEP citation, attention is drawn to paragraphs [0058]-[0061] which clearly teach one of ordinary skill in the art to use a ratio of 0.245:1(oxide: NPD) and a thickness of 130 nm for the mixed layer. Regarding instant claims 30-33, 35, and 36, the claim merely requires a composition to have "transparency". Transparency is a property like

absorbance. This is not the same as stating the composition is transparent. Every composition has transparency just as every composition has transmittance. The percentage of transparency and transmittance will vary from composition to composition. For example a transparent composition will have high transparency while an opaque composition will have a low transparency. However both compositions have transparency. Therefore the claim limitation is met.

Therefore, given the overlap between the present claims and the patented claims, it would have been within the skill level of, as well as obvious to, one of ordinary skill in the art to use the device which is both disclosed by U.S. Patent 7,732,808 B2 and encompassed by the scope of the present claims in view of Shirota et al. (US 5,487,953) and thereby arrive at the present invention.

Response to Arguments

13. Applicant's arguments filed 30 September 2010 have been fully considered but they are not persuasive.

Applicants argue that the Official Action has not set forth sufficient reasons why one of ordinary skill in the art at the time of the present invention would have incorporated Seo et al. (US 2002/0086180 A1) into Sato et al. (US 2003/0218418 A9) because Sato teaches that material used for the hole transporting layer needs a small ionization potential, high hole mobility and excellent stability and Seo et al. does not teach using a material of an oxide of a transition metal as a hole injecting layer. Applicants also apply this argument to Sato et al. in view of Seo et al. and Shirota et al.

(US 5,487,953) asserting that there is insufficient reason to combine Sato et al., Seo et al. and Shirota et al.

However as explained above Seo et al. teach one of ordinary skill in the art that by combining the layers (hole injection and transporting layers) the energy barrier can be reduced lowering drive voltage and increasing service life of the device (Seo et al. [0032]-[0034]). Thus Seo et al. give one of ordinary skill in the art motivation to combine the references. Shirota et al. teach one of ordinary skill in the art that hole transporting layers utilizing carbazole compounds have high heat resistance capable to enable high luminance with a high efficiency for a long time (Shirota et al. column 1, lines 57-60), giving one of ordinary skill motivation to combine the teachings of Shirota et al. with the device of Sato et al.

Applicants also argue that carbazole compounds and hole transporting compounds of Sato et al. are not recognized to be equivalent or interchangeable. If these compounds were equivalent and interchangeable, Applicants argue, then one of ordinary skill in the art would anticipate that the composite material formed of amine compound and the oxide of the transition metal would have a high absorption peak in the infrared region and the visible light region, which is not the actual result as demonstrated in the present application.

However equivalent or interchangeable does not mean identical, one of ordinary skill in the art with the disclosures of Shiratsuchi et al. (US 6,084,176) and Shirota et al. (US 5,487,953) would understand carbazole compounds to be equally suitable as hole transporting material for an electroluminescent device. The prior art very clearly

demonstrates both carbazole and arylamine compounds to be hole transporting materials. Thus one of ordinary skill in the art would expect similar results with arylamine and carbazole compounds used in hole transporting layers. Some differences in properties would be expected (hole mobility, HOMO/LUMO values, etc.) because the compounds are not identical. The absorbance data presented by Applicants (pages 21 and 22 of Remarks) is not a good comparison of the materials. Figure 5 has a y-axis of 0 to ~0.2 and an x-axis of ~200 to 2000nm. Figure 7 has a y-axis of 0 to 0.6 and an x-axis of ~200 to 2000nm. Figure 12 has a y-axis of 0 to 0.4 and an x-axis of 300 to ~2500nm. These differences prevent a side by side comparison of the spectra. However figure 12 shows an absorbance peak at ~800 nm with a similar intensity (~ 0.8) to the "high absorption peaks" of figure 5 and shows a shoulder peak at ~400 nm which could correspond to the absorbance peaks at ~450 nm in figure 5. The fact that the absorbance at ~400 nm in figure 12 is different (a shoulder vs. a peak) from the peak at ~450 nm in figure 5 would not be considered surprising because the metal oxides are different, changing the energy of the observed electronic transitions.

Further if applicants intend to argue the absorbance spectra to demonstrate unexpected results it is noted that the data is not commensurate with the scope of the claims. Evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains and that such evidence which is considerably narrower in scope than claimed subject matter is not sufficient to rebut a prima facie case of obviousness. *In re Dill*, 604 F.2d 1356, 1361, 202 USPQ805, 808 (CCPA 1979). Also see *In re Boesch*, 617 F.2d at 276, 205 USPQ at

219; *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972) and *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). *In re Kulling*, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1058 (fed. Cir. 1990) ("'[O]bjective evidence of nonobviousness must be commensurate in scope with the claims.'" (quoting *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972); *In re Dill*, 604 F.2d 1356, 1361, 202 USPQ 805, 808 (CCPA 1979) ("The evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains.").

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL H. WILSON whose telephone number is (571)270-3882. The examiner can normally be reached on Monday - Thursday 7:30-5:00 (EST), Friday 7:30-4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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MHW